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the two-planet belts, except, perhaps that of Neptune and Uranus, will be long regarded as having been "thrown off" by the mere increase of centrifugal velocity. But if the separation is owing to the velocity acquired by subsidence, a satellite may have any velocity which can be maintained by stable harmonic action.

One of the simplest sources of harmony is the division of a linear pendulum into three equal parts, and the synchronism of vibration, whether the suspension is made at the extremity, or at either of the dividing points. In the case of Mars, if we start from a point near the theoretical beginning of nebular condensation for the outer satellite (see Phil. Mag. for Oct. 1877, page 292), and take a series of harmonic divisors of the form $d_{n+1} = 3d_n - d_1$, we find the following accordances:

Divisors.		Quotients.	Observed.
13.7	$d_1 = 1$	13.700	13.692 = Nebular radius.
$d_2 = 3d_1 - d_1 = 2$		6.850	6.846 = Deimus.
$d_3 = 3d_2 - d_1 = 5$		2.740	2.730 = Phobus.
$d_4 = 3d_3 - d_1 = 14$		.979	1.000 = Semidiameter.
$d_5 = 3d_4 - d_1 = 41$		.334	.333 = Centre of radial occil'n,
$d_6 = 3d_5 - d_1 = 122$			120.560 = Moon's major axis.
$d_7 = 3d_6 - d_1 = 365$			365.256 = Terrestrial year.

The reason for the accordance of the terrestrial and lunar harmonies with those of the Martial system, may be understood by considering that the Earth is midway between the secular perihelion of Mercury and the secular aphelion of Mars, and is, therefore, the centre of the belt of greatest condensation in the solar system.

NOTE ON PROF. A. HALL'S QUERY IN VOL. VII, NO. 4, BY PROF. H. T. EDDY.—The eight values which $\nabla^2 v$ assumes at the surface of an attracting body, when v is the potential due to the attraction of the body are explained in sufficient detail in Mr. Todhunter's History of the Theory of Attraction and Figure of the Earth. In chapter XXXI, which he devotes entirely to the consideration of this function of v, he discusses the erroneous result $-2\pi\rho$ obtained by Poisson, as well as the erroneous results obtained by Ostragradsky at singular points of the surface.

I object to the statement made by Mr. Stone in answer to this query in Vol. VII, No. 5, where he states that these eight values are obtained on the supposition that the second differential coefficients of v with respect to x, y, z are independent. The word *independent* does not correctly convey the idea. Each of the three differential coefficients of v has two *distinct* values, the one derived from v_1, the potential outside the body, the other from v_2, the potential inside the body. According as we select one or another set of values to make up $\nabla^2 v$ we arrive at one or other of eight distinct values, six of which have no physical significance, and the remaining two, 0 and $-4\pi\rho$ are said to hold at a point on the surface, in the sense that however near the point be to the surface on the outside the vulue is 0, while however near the point be to the surface on the inside the value is $-4\pi\rho$.

ANSWER TO QUERY AT P. 16 BY H. HEATON, PERRY, IOWA.—Put $v =$ the volum, and $w =$ weight of the portion of the stack above any stratum. Then the volume and weight of the stratum will be represented, respectively, by dv and dw. Let n be the ratio of weight to density, or density $= nw$. Then $dw = nwdv$, or $dw \div w = ndv$. Integrating, $\log w = nv + c$. When $v = 0$, $w = 0$ and $\log w = -\infty$; $\therefore$ $-\infty = c$. Whence it appears that unless we make an additional assumption the division cannot be made.

If we assume that a *weight*, b, however small, is placed on top of the stack, then when $v = 0$ $w = b$, therefore $c = \log b$, and $\log(w \div b) = nv$, $w = be^{nv}$.

If W and V be the weight and volume of the stack, $W = b(e^{nV} - 1)$.

If v_1 and v_2 are respectively $\frac{1}{3}$ and $\frac{2}{3}$ the volume of the stack,

$$\tfrac{1}{3}b(e^{nV} - 1) = b(e^{nv_1} - 1), \text{ and } \tfrac{2}{3}b(e^{nV} - 1) = b(e^{nv_2} - 1);$$

$$\therefore\ v_1 = \log\left[\tfrac{1}{3}(2 + e^{nV})\right] \div n \text{ and } v_2 = \log\left[\tfrac{1}{3}(1 + 2e^{nV})\right] \div n.$$

[Professor De Volson Wood answered this query in a similar manner.]

NOTE ON "REPLY TO CRITICISMS." (SEE P. 10).—Mr. Christie dissents to the conclusions arrived at by Prof. Wood, and insists that his criticisms are in all respects valid and un-refuted by the Reply. We think it best, however, not to prolong the discussion in the ANALYST, as such of our readers as are interested in the subject can, doubtless, draw satisfactory conclusions from what has been said.—Editor.

SOLUTION OF PROB. 331 BY W. E. HEAL.—Denote the given curve by BCD. Form its reciprocal with the point O as origin, and denote this reciprocal by RST. Let s be a multiple point of the curve RST. Then the point p in which OS meets BCD will be a point of contact of a mult. tang. of BCD. Now, the Hessian of RST passes thro' all mult. points of RST.

Therefore the reciprocal, with respect to O, of this Hessian passes thro' all the points of contact of the multiple tangents of BCD. In like manner it is seen that it also passes thro' the p'ts of inflexion of BCD. *Q. E. D.*